

RemarksRejections under 112

Claims 1, 14, 28, 30 and 32 were rejected under section 112, first paragraph and section 112, second paragraph. Applicant traverses these rejections based on the following comments. Applicant has amended the claims to remove the preamble reference to formation fluids (claims 1 and 14) for purposes of clarifying the claimed subject matter. Further, Applicant has amended the claim recite that each of the measurements are being made with respect to an earth formation (claims 1, 14, 28 and 32) or with respect to a gas-liquid sample (claim 30). Further, Applicant has amended the claim to recite that the oil volume fraction (claims 1 and 14), the rock-matrix travel time (claim 28) and the gas fractional volume (claim 30) is determined from a combination of the various claimed acquired measurements.

Applicant respectfully asserts these amendments satisfy the concerns set forth in the Office Action with respect to section 112, second paragraph. First, the preamble no longer recites a result that is not contained in the subsequent steps, for example, in claim 1 the preamble now coincides with the claimed step of "determining an oil volume fraction." Second, the oil volume fraction, or other determinations, is recited as being determined based on a combination of the acquired measurements. Finally, the claimed elements are now cooperatively linked together in that the oil volume fraction determination, or other determinations, relates to the acquired measurements that are acquired for a particular region of an earth formation or gas-liquid sample.

Each of these amendments alone and in combination addresses the rejections under section 112, second paragraph, and specifically, the indefiniteness rejection, the rejections based on omission of essential steps and elements and the rejection based on the omission of the cooperative relationship of the elements.

Claims 1, 14, 28, 30 and 32 have also been rejected under section 112, first paragraph, for failure to satisfy the enablement requirement. Applicant respectfully traverses this rejection.

Specifically, with respect to claim 1, Applicants claim, in part, a method for determining an oil volume fraction from a combination of the NMR and dielectric measurements. Each of these elements are discussed in detail at various sections in the specification. First, at least at paragraphs 2-6 and 12, Applicant discusses the state of the art with respect to obtaining NMR measurements via a logging or sampling tool. At least at paragraphs 7-9, Applicant discusses the state of the art with respect to obtaining dielectric measurements via a microwave or high-frequency dielectric tool. The novel and non-obvious combination of NMR with dielectric measurements is discussed in detail, with mathematical derivations, at least at paragraphs 26-29. The bulk density measurement is discussed at least at paragraphs 10-13. Model based equations are discussed at least at paragraphs 60, and 62-63. The rock-matrix travel time of claim 28 is discussed at least at paragraph 59. The fluid sampling process is discussed at least at paragraphs 12-13 and 40. The heavy oil volume is discussed at least at paragraph 63. The remainder of the claims recite combination of these elements. Therefore, because each and every element is disclosed in Applicant's specification, Applicant respectfully asserts that the application satisfies the enablement requirement.

Applicant notes the statement in the Office Action that "the claim is simply a mathematical formula...which is not useful and not statutory...." It is not clear whether this constitutes a rejection under 35 USC 101. Applicant respectfully asserts the claims explicitly go beyond merely claiming a mathematical algorithm scientific principle. Although Applicant seeks to meet its enablement requirement, in part, through mathematical derivations, this should only strengthen the completeness of the disclosure, not subject the novel and non-obvious innovation to a non-statutory rejection. It is the process of combining distinct physical formation evaluation measurements which are obtained, in most cases, by different tool components under different measurement principles, that is sought to be patented.

Related to this point, the Office Action states that the claim fails as statutory subject matter because it does not recite the type of measurements that is acquired. Applicants respectfully traverses. The claims variously recite combinations of NMR, dielectric and density

measurements. The fact that these types of measurements can be further limited does not require that a claim be so limited. An alternate view would require an inordinate number of independent claims to cover each embodiment. Analogy can be made to the common use of genus independent claims on conjunction with more specific dependent claims that recite species within that genus class. Applicant is entitled to broadly claim all it is entitled given the prior art available. Should limitations become necessary, Applicant is certainly willing to consider amendments in view of prior art references.

CONCLUSION

The Applicants believe this paper is fully responsive to each and every ground of rejection and objection cited by the Examiner, and respectfully request that the application proceed to grant.

Please charge any applicable fees, or apply any excess, to deposit account number 19-0610.

Respectfully submitted,


Kevin P. McEaney, Reg. No. 46,258

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Date

Schlumberger Technology Corporation
Office of Patent Counsel
200 Gillingham Lane, MD 200-9
Sugar Land, TX 77478
Telephone: 281-285-7325
Facsimile: 281-285-4232